WHAT IS CLAIMED IS:

1. An encoding system for encoding digital data for transmission through a communication channel, comprising:

a DCF encoder, adapted to receive a first data sequence, and to generate a first DCF code word and a new running digital sum, both of which incorporate information from the first data sequence and a pre-existing running digital sum, wherein the new running digital sum is limited to a maximum absolute value; and

a parity encoder operatively coupled to the DCF encoder, and adapted to receive the first DCF code word from the DCF encoder, and to generate a first interleaved parity code word incorporating information from the first DCF code word, and to provide the first interleaved parity code word to a channel.

2. The encoding system of claim 1, wherein the DCF encoder is further adapted such that the first DCF code word comprises a number n bits, and the maximum absolute value is less than 2*n.

3. The encoding system of claim 2, wherein the DCF encoder is further adapted such that the maximum absolute value is n.

4. The encoding system of claim 2, wherein the DCF encoder is further adapted such that the first data sequence comprises n-1 bits of data relative to the number n defined by the DCF encoder.

5. The encoding system of claim 2, wherein the DCF encoder is further adapted such that n is an integer from the range of 2 through 200.

6. The encoding system of claim 5, wherein the DCF encoder is further adapted such that n is an integer from the range of 8 through 20.

7. The encoding system of claim 5, wherein the DCF encoder is further adapted such that n is an integer from the range of 21 through 80.

8. The encoding system of claim 1, wherein the parity encoder is further adapted to generate at least two parity bits as a function of the DCF code word, and to generate the first interleaved parity code word incorporating the parity bits therein.

9. The encoding system of claim 1, wherein the parity encoder is further adapted to generate a second interleaved parity code word incorporating information from the first DCF code word, and to provide the second interleaved parity code word to a channel.

10. The encoding system of claim 1, wherein the parity encoder is further adapted such that generating the first interleaved parity code word comprises generating a first parity code word and a second parity code word, and interleaving the first parity code word and the second parity code word.

11. The encoding system of claim 10, wherein the parity encoder is further adapted such that d is a modulus, and such that generating the first parity code word comprises receiving a first input code word that incorporates information from the first DCF code word, and adding d-1 parity bits to the first input code word.

12. The encoding system of claim 11, wherein the parity encoder is further adapted such that generating the second parity code word comprises receiving a second input code word, and adding d-1 parity bits to the second input code word.

13. The encoding system of claim 12, wherein the parity encoder is further adapted such that the second input code word also incorporates information from the first DCF code word.

14. The encoding system of claim 12, wherein the parity encoder is further adapted such that the

second input code word incorporates information from the second DCF code word.

15. The encoding system of claim 11, wherein the parity encoder is further adapted such that generating the second parity code word comprises receiving a second input code, and adding d-1 parity bits to the second input code word.

16. The encoding system of claim 11, wherein the parity encoder is further adapted such that generating the first parity code word further comprises selecting a first residue r1, wherein the d-1 parity bits added to the first input code word are such that a base of the first parity code word is congruent to r1 modulo d.

17. The encoding system of claim 16, wherein the parity encoder is further adapted such that the base of the first parity code word is the digital sum of the first input code word.

18. The encoding system of claim 10, wherein the parity encoder is further adapted such that generating the first interleaved parity code word comprises re-ordering bits of the first parity code word and of the second parity code according to a pseudorandom rule.

19. The encoding system of claim 10, wherein the parity encoder is further adapted such that generating the first interleaved parity code word comprises re-ordering bits of the first parity code word and of the second parity code according to a bit-wise rule.

20. The encoding system of claim 1, further comprising an RLL encoder operatively coupled to the DCF encoder, wherein the RLL encoder is adapted to receive an RLL input data sequence, and to generate a first RLL code word, wherein the first data sequence, received by the DCF encoder, incorporates information from the first RLL code word.

21. The encoding system of claim 1, further comprising a transition precoder operatively coupled to the DCF encoder, wherein the transition precoder is adapted to receive a transition precoder input code word, and to generate a transition precoded data word, wherein the first data sequence, received by the DCF encoder, incorporates information from the first transition precoded data word.

22. The encoding system of claim 20, further comprising a transition precoder operatively coupled to the RLL encoder and to the DCF encoder, wherein the transition precoder is adapted to receive the first RLL code word, and to generate a transition

precoded code word incorporating information from the first RLL code word, wherein the DCF encoder is further adapted such that the first data sequence, received by the DCF encoder, incorporates information from the first transition precoded code word.

23. The encoding system of claim 20, wherein the RLL encoder is further adapted such that a run length limit k of the first RLL code word is an integer from the range of 4 through 100.

24. The encoding system of claim 1, further comprising a decoder adapted to receive the interleaved parity code word from the channel, and to generate a read signal incorporating information from the interleaved parity code word.

25. The encoding system of claim 24, wherein the read signal is substantially similar to the first data sequence.

26. A method for encoding a data sequence, comprising the steps of:

receiving a first data sequence by a DCF encoder;

generating a first DCF code word, incorporating information from the first data sequence and a pre-existing running digital sum, by the DCF encoder;

generating a new running digital sum, incorporating information from the first data sequence and a pre-existing running digital sum, by the DCF encoder, wherein the new running digital sum is limited to a maximum absolute value;

receiving the first DCF code word from the DCF encoder, by a parity encoder;

generating a first interleaved parity code word, incorporating information from the first DCF code word, by the interleaved parity code word; and

providing the first interleaved parity code word to a channel.

27. The method for encoding a data sequence of claim 26, further comprising the steps of:

receiving a first input data sequence by an RLL encoder; and

generating a first RLL code word by the RLL encoder, wherein the first data sequence, received by the DCF encoder, incorporates information from the first RLL code word.

28. The method for encoding a data sequence of claim 26, further comprising the steps of:

receiving a first input data sequence by a transition precoder; and

generating a first transition precoded data word, wherein the first data sequence, received by the

DCF encoder, incorporates information from the first transition precoded data word.